

SASH BALANCE SHOE JAMB ATTACHMENT

[0001] This application claims the benefit of U.S. Provisional Application No. 60/462,893, filed 04/15/2003.

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0002] The invention pertains to mounting of cord or string supported sash balances, more particularly to fixed attachment of one end of a sash balance shoe support cord to a window jamb.

2. Description of the Prior Art

[0003] In one prevalent prior art arrangement, the end of a cord that is spring tensioned on the shoe, is attached to the jamb or window frame by a screw to which the end of the cord is tied. This arrangement requires at least two hands to install, and can result in thread stripping and a cocked screw head that interferes with shoe travel if the screw is in the jamb's shoe track.

[0004] In another prior art arrangement, the end of the cord that extends from the shoe is attached to a hook that hooks into a hole, usually an oblong hole, in the jamb. This arrangement is more convenient to install than a screw, but the hook is sometimes dislodged from the jamb by catching the passing shoe, or when tension is momentarily lost in the cord.

## SUMMARY OF THE INVENTION

[0005] It is one object of the invention to provide a fastener for a spring tensioned cord emanating from a sash balance shoe, that fastens in a hole in the jamb along which the shoe travels.

[0006] It is another object of the invention that the fastener and cord does not prevent movement of the shoe past the fastener.

[0007] It is another object of the invention that the fastener and cord cannot be dislodged from the jamb by movement of the shoe across the fastener.

[0008] It is another object of the invention that the fastener is tightened in the hole by movement of the shoe across the fastener.

[0009] It is another object of the invention that the fastener is tightened in the hole by tension of the cord in any radial direction normal to the axis of the hole in the jamb.

[0010] Other objects and advantages will become obvious to one reading the ensuing description of the invention.

[0011] This application claims the benefit of U.S. Provisional Application No. 60/462,893, filed 04/15/2003 which is hereby incorporated herein in its entirety by reference.

## BRIEF DESCRIPTION OF THE DRAWINGS

[0012] In order that the invention be more fully comprehended, it will now be described, by way of example, with reference to the accompanying drawings, in which:

[0013] FIG. 1 is a front perspective view of a sash mounted on a sash balance attached to a window jamb balance travel track by a cord and fastener according to the invention. The balance is below the fastener.

[0014] FIG. 2 is a front schematic view of the sash, balance, track and jamb of Figure 1, showing the jamb in cross section.

[0015] FIG. 3 is a front schematic view of the elements in Figure 2, in which the balance is passing across the fastener.

[0016] FIG. 4 is a side schematic view taken along 4-4 in Figure 2, of the cord attached to the jamb by the fastener.

[0017] FIG. 5 is a side schematic view of the shoe, cord and fastener of Figure 2.

[0018] FIG. 6 is a front view of the fastener of Figure 2.

[0019] FIG. 7 is a front view of another fastener of the invention.

[0020] FIG. 8 is a front perspective view of a prying tool for removing a fastener of the invention.

[0021] FIG. 9 is a front schematic view of the fastener of Figure 7, in another jamb.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0022] Before explaining the invention in detail, it is to be understood that the invention is not limited in its application to the detail of construction and arrangement of parts illustrated in the

drawings since the invention is capable of other embodiments and of being practiced or carried out in various ways. It is also to be understood that the phraseology or terminology employed is for the purpose of description only and not of limitation.

[0023] Referring to Figures 1- 4 and 6, sash 30 containing lights 34 is mounted by pivot bar 32 on shoe 36. Shoe 36 moves vertically 42 on track 44, supported vertically by cord 46 which extends through one-piece fastener 50 by way of axial hole 82 and is formed into knot 54 which prevents withdrawal of the cord from the fastener.

[0024] Fastener 50 extends through circular hole 56 in jamb 84. Fastener 50 is preferably molded plastic. Fastener 50 is preferably molded in one piece. Ridges 62 and 64 on leg 68 are spaced 66 axially from surface 70 of head 107. Ridge 64 extends radially outside the hole over surface 74 of wall 72 of track 44 when surface 70 abuts on surface 76 of wall 72 of the track.

[0025] Preferably there are at least two ridges spaced so that at least one of the ridges extends radially outside the hole over surface 74 of wall 72 of track 44 when surface 70 abuts on surface 76 of wall 72 of the track.

[0026] A cord pulling radially with respect to axis 78 in any angular direction within the 360 degree arc about the axis, at end 80 of hole 82 through fastener 50 is prevented from dislodging fastener 50 from hole 56 by the ridge that extends over surface 74. Also, a radially pivoting force about a first ridge that is in hole 56 between surfaces 74, 76 causes a second ridge, if in the hole, to grip the inner surface of the hole, and if outside the hole to resist withdrawal of the second ridge from surface 74. Convex surface 106 cams with the shoe, exerting an increasing insertion force on fastener 50 when the shoe passes across convex surface. The passing shoe cannot knock the fastener out of hole 56.

[0027] The ridges are beveled 108 and flexible enough so that leg 68 can be inserted into hole 82.

[0028] Referring to Figures 1- 5, when shoe 36 is in track 44, rotating a sash pivot bar that extends into oblong opening 86 of metal cam 88 rotates the cam so that arms 92, 94 of plastic brake element 90 move apart forcing brake surfaces 96, 98 to bear against inward facing surfaces 99, 101 of walls 102, 104. Brake element 90 is fastened in a metal U-shaped channel by cross bar rivets 122, 124.

[0029] Cord 46 supports shoe 36 by way of spring loaded 112 block and tackle 114 which draws 52 the cord to the shoe.

[0030] Referring to Figs. 7 and 8, in fastener 116, like elements to elements in fastener 50 have the same numerals as fastener 50. Annular shoulder 118 having a smaller diameter 126 than maximum diameter 128 of head 130 provides annular axially facing surface 120 for prying fastener 116 out of hole 56 by inserting fingers 138 of steel prying tool 140 between surface 120 and surface 76 of wall 72 of the track when fastener 116 is in hole 56.

[0031] Referring to Fig. 9, ridge 62 is bent toward leg 68 and toward head 130 by the annular wall of hole 144 when fastener 116 is pressed, ridge 64 first, into hole 144 in wall 142. Ridge 64 springs radially outward after ridge 64 passes through the hole. Surface 70 stopping against surface 148 of the wall prevents pushing the fastener through the wall. Surface 150 of ridge 64 prevents withdrawal of the fastener from the wall when surface 150 comes up against surface 154 of the wall when the fastener is pulled from head 130 side of the fastener.

[0032] Although the present invention has been described with respect to details of certain embodiments thereof, it is not intended that such details be limitations upon the scope of the invention. It will be obvious to those skilled in the art that various modifications and substitutions may be made without departing from the spirit and scope of the invention as set forth in the following claims.

[0033] What is claimed is: